


## **Cal/ACT Spring Conference San Diego**



**Air Resources Board  
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 California Environmental Protection Agency  
**AIR RESOURCES BOARD**

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## **Why Are Diesel Emissions a Concern?**

- Toxic Air Contaminant
- SIP Attainment
  - Diesel NO<sub>x</sub> and ROG contribute to ozone and secondary PM formation
  - Diesel PM

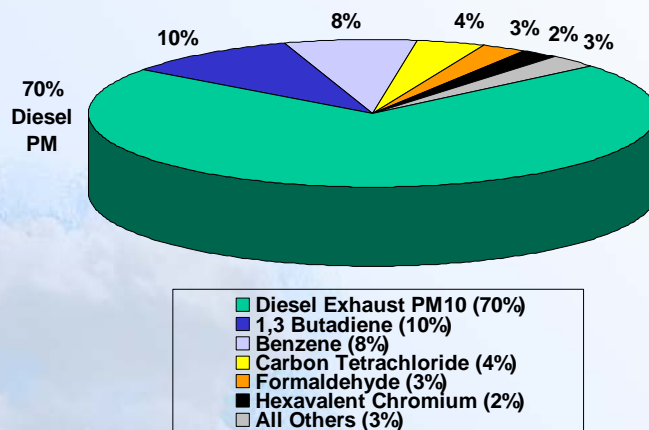
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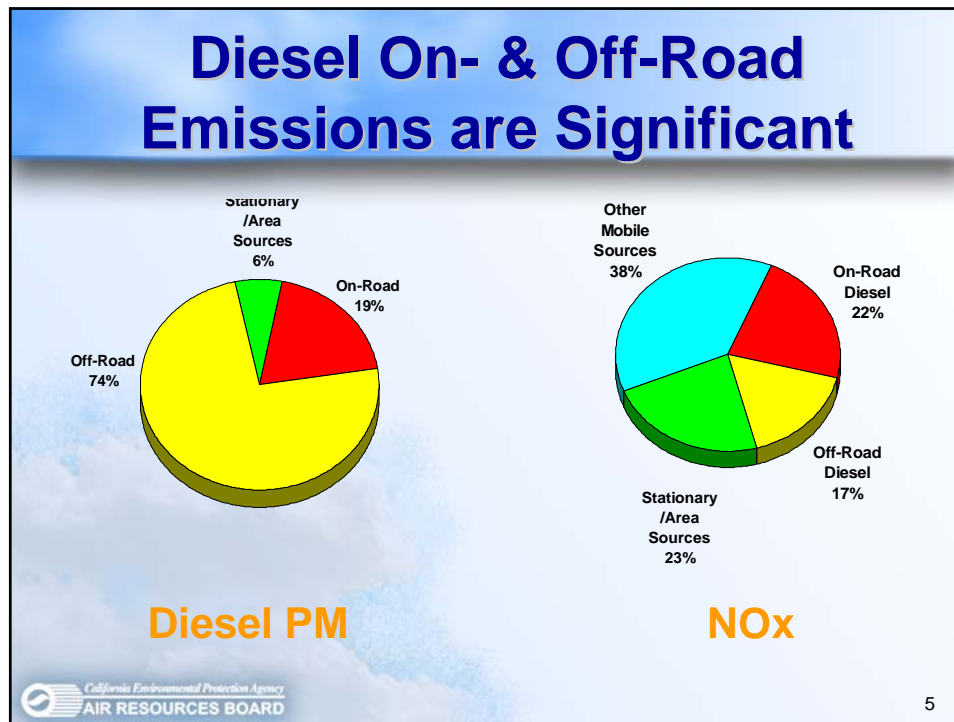
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## Health Impacts of Diesels in California

- Annual health impacts
  - 2,900 premature deaths
  - 3,600 hospital admissions
  - 240,000 asthma attacks/respiratory symptoms
  - 600,000 lost days of work
- By comparison
  - 3,700 deaths from car accidents
  - 2,000 homicides

## Statewide Average Potential Ambient Cancer Risks for 2000





## Why Reduce In-use Diesel Emissions?

- Diesel Engines are Long Lived
- New Engine Standards Offer Long Term Reductions
- In-use Emission Rules Provide Near-Term Reductions
- Control Technology is Available

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## Diesel Risk Reduction Plan

- Adopted in 2000
- Goal is to Reduce Diesel PM By 75% by 2010 & 85% by 2020
- Measures
  - New Diesel Engine Standards
  - In-Use Controls on Existing Engines
  - Cleaner Low Sulfur Diesel Fuel

## Diesel Risk Reduction Plan - In-Use Engine Measures

- On-Road Engines
  - ✓ – Solid Waste Collection Vehicles
  - Public HDV Fleets
  - Private HDV Fleets
- Off-Road Engines
- Stationary Engines
- Original Focus was on Retrofitting

# **DIESEL EMISSION CONTROL STRATEGIES**

## **Diesel Emission Control Strategy Verification Procedure**

- Required PM Reduction - 25% Minimum
- Optional NOx Reduction - 15% Minimum
- Emission Testing
- Durability Demonstration
- Emission Control Group/Applicability
- Warranty
- In-Use Compliance Testing
  - Consistent with U.S. EPA Requirements

## Diesel Emission Control Strategy Verification Levels

- Level 1
  - 25% or greater PM Reduction
- Level 2
  - 50% or greater
- Level 3
  - 85% or greater or  $\leq 0.01$  g/bhp-hr
- Optional NOx Reduction, 15% min.

## Current Level 3 Verifications\*

- Level 3 PM only
  - CleanAir Systems (stationary only)
  - Clean Air Partners (dual-fuel only)
  - Lubrizol Purifilter
  - Donaldson DPM
- Level 3 with 25% NOx Reduction
  - Cleaire Flash & Catch
  - Cleaire Longview

\*as of March 2004

## Installed Diesel Particulate Filter



- Level 3, 85% PM Reduction
- Reduces HC & CO also
- Backpressure Monitor required
- Engine must meet filter manufacturer's exhaust temperature criteria for use

## Current Verifications\*

- Level 1 PM Only
  - Donaldson DOC + Spiracle
  - Donaldson DOC + Spiracle + ULSD
  - Donaldson DOC + ULSD
- Level 1 plus 25% NO<sub>x</sub> Reduction
  - Cleaire Flash and Match

\*as of March 2004



## Diesel Oxidation Catalyst



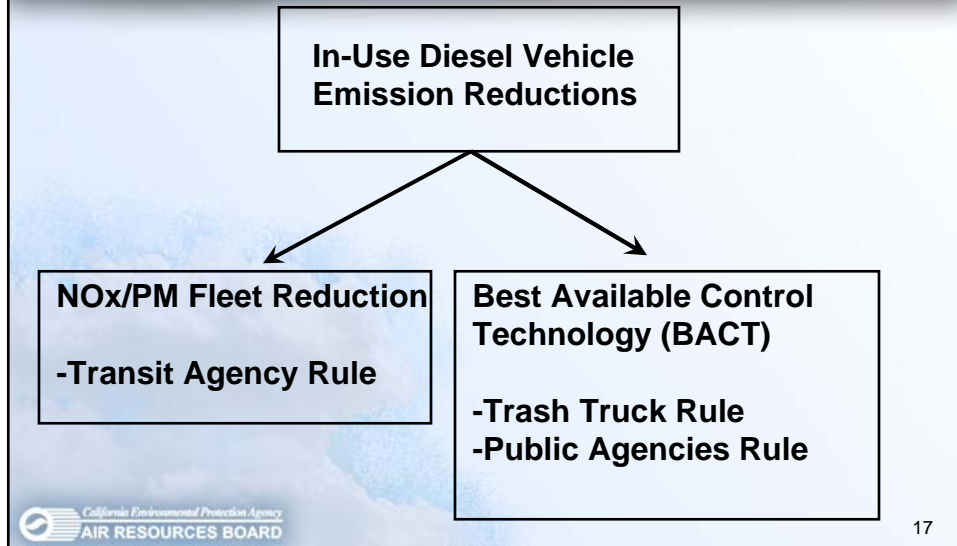
- Up to 90% CO & HC reductions
- Level 1 - 25% reductions PM may be expected
- Lower operating temperatures
- Can be used on older engines with poor oil control
- Requires no maintenance

## Current Verifications

- No longer verified as of January 1, 2004
  - Engelhard DPX
  - Johnson Matthey CRT
- Manufacturers chose not to meet adopted rule's warranty requirements
- Product sold before 1/1/2004 continue to be legal



## Approaches for Regulations



## Fleet Rule for Transit Agencies

- Adopted 2000; Amended 2002
- All transit agencies must reduce NOx and PM emissions
- Fleet emissions reduction method
- Stresses advanced technologies

## **In-Use Urban Bus Requirements**

- Low Sulfur (<15 ppm) Diesel Fuel
  - as of July 1, 2002
- 4.8 g/bhp-hr NO<sub>x</sub> Fleet Average
  - as of October 1, 2002
- PM Reductions 2003 through 2008
  - Goal is 85% Reduction from Baseline

## **Proposed Amendments For Transit Agencies**

Non-Urban Buses  
Urban Buses

## **Scope Fleet Rule for Transit Agencies**

- Not Covered by the Current Rule:
  - Transit Agency “Non-Urban” Buses
  - Public Agency Buses
    - E.G., Airports, Universities
  - Other Buses: Non-transit
  - Private Buses
    - Charters, Tourism

## **Transit Agencies**

### **Proposed Fall Board Hearing**

- Add
  - Non-Urban Bus Definition
  - Non-Urban Bus NOx Fleet Requirements
  - Non-Urban Bus PM Fleet Requirements
  - Reporting Requirements

## Who and What Will it Affect?

- Transit Agencies
  - Operating “Non-urban” Buses
- “Non-urban Buses”
  - Bus powered by a medium heavy-duty truck engine
  - Bus (medium or heavy heavy-duty engine) not used in transit services

## Non-Urban Bus: Proposed NOx Requirements

- NOx Fleet Average Reduction
  - Two Step Reduction
    - 3.2 g/bhp-hr in 2007
    - 2.4 g/bhp-hr in 2010
    - Based on engine certification
  - Similar implementation as for Urban Buses

## **Non-Urban Bus: Proposed PM Requirements**

- Total PM Reduction
  - Baseline January 1, 2005
  - Same method as for Urban Buses
- Implementation Schedule:
  - 25% reduction by 2007
  - 50% reduction by 2009
  - 80% reduction by 2011, or average of 0.01 g/bhp-hr PM

## **Non-Urban Bus: Proposed Reporting Requirements**

- Reporting Requirements Mirror Existing Transit Fleet Rule
- Initial Report of Baseline Due 1/31/2006
- Annual Reports of Reductions Due Each 1/31 through 2016.

## **Examples of NOx and PM Calculations**

- **See Handout** —

## **FLEET RULE FOR TRANSIT AGENCIES**

### **Non-urban bus and HD Vehicle Survey**

## Survey

- Better Data = Better Inventory
- Inventory Required to Understand Emission Reductions Gained
- Survey Response Low Thus Far
  - 50 out of 70 transit agencies
  - 22 out of 250 possible transit and paratransit agencies

## Survey

We need your input!

Get the survey at:

[http://www.arb.ca.gov/  
msprog/bus/reportingforms.htm](http://www.arb.ca.gov/msprog/bus/reportingforms.htm)  
(second bullet)



## **FUTURE FLEET RULES**

## **Future Fleet Rules Schedule**

- Public Agency On-road
  - 2004
- Public Agency Off-road Equipment
  - 2004 or 2005
- Private On-road Vehicles
  - 2005
- Private Off-road Vehicles
  - 2006

## Contacts

### **Fleet Rule for Transit Agencies**

[www.arb.ca.gov/msprog/bus/bus.htm](http://www.arb.ca.gov/msprog/bus/bus.htm)

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